Package 'metabook'

May 8, 2026

Title Data Sets and Code for ``Meta-Analysis with R"

Version 0.2-0

Date 2026-03-13

Depends R (>= 4.0.0)

Suggests meta, netmeta, metasens, netdose

Author Guido Schwarzer [cre, aut] (ORCID:
<https://orcid.org/0000-0001-6214-9087>)

Maintainer Guido Schwarzer <guido.schwarzer@uniklinik-freiburg.de>

URL https://github.com/guido-s/metabook/

Description Data sets and code supporting the second edition of ``Meta-Analysis with R"; first edition: Schwarzer, Carpenter, and Rücker (2015) <DOI:10.1007/978-3-319-21416-0>.

LazyData TRUE

License GPL (>= 2)

Encoding UTF-8

RoxygenNote 7.3.3

NeedsCompilation no

Repository CRAN

Date/Publication 2026-03-13 10:30:02 UTC

Contents

`metabook-package` *metabook: Data Sets and Code for "Meta-Analysis with R"*

Description

Data sets and code supporting the second edition of "Meta-Analysis with R" by Schwarzer, Carpenter, and Rücker.

Author(s)

Guido Schwarzer <guido.schwarzer@uniklinik-freiburg.de>

References

Balduzzi S, Rücker G, Schwarzer G (2019): How to perform a meta-analysis with R: a practical tutorial. *Evidence-Based Mental Health*, **22**, 153–160

Schwarzer G, Carpenter JR and Rücker G (2015): *Meta-Analysis with R (Use-R!)*. Springer International Publishing, Switzerland

See Also

Useful links:

- https://github.com/guido-s/metabook/

Baker2009 *Studies on Pharmacologic Treatments for Chronic Obstructive Pulmonary Disease*

Description

Results from 39 trials examining pharmacologic treatments for chronic obstructive pulmonary disease (COPD).

Usage

```
Baker2009
```

Format

The data frame contains the following columns:

study	character	study label
year	numeric	year of publication
id	numeric	study ID
treatment	character	treatment
exac	numeric	number of individuals with one or more COPD exacerbations
total	numeric	number of individuals

Details

This data set comes from a systematic review of randomized controlled trials on pharmacologic treatments for chronic obstructive pulmonary disease (COPD) (Baker et al., 2009).

The primary outcome, occurrence of one or more episodes of COPD exacerbation, is binary (yes / no). For this outcome, five drug treatments (fluticasone, budesonide, salmeterol, formoterol, tiotropium) and two combinations (fluticasone + salmeterol, budesonide + formoterol) were compared to placebo. The authors considered the two combinations as separate treatments instead of evaluating the individual components.

Concepts

medicine, pulmonology, odds ratios, network meta-analysis, component network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Baker WL, Baker EL, Coleman CI (2009): Pharmacologic treatments for chronic obstructive pulmonary disease: A mixed-treatment comparison meta-analysis. *Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy*, **29**(8), 891–905. doi:10.1592/phco.29.8.891

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print odds ratios and confidence limits with two digits
oldset <- settings.meta(digits = 2)

# Transform data from long arm-based format to contrast-based
# format. Argument 'sm' has to be used for odds ratio as summary
# measure; by default the risk ratio is used in the metabin function
# called internally.
pw <- pairwise(treatment, exac, total, studlab = paste(study, year),
  data = Baker2009, sm = "OR")

# Conduct random effects network meta-analysis (NMA)
# with placebo as reference
nma <- netmeta(pw, common = FALSE, ref = "plac")

# Show network graph
netgraph(nma, seq = "optimal", start = "prcomp",
  labels = gsub("+", " +\n", trts, fixed = TRUE),
  plastic = TRUE, thickness = "se.common", number = TRUE,
  points = TRUE, cex.points = 5, col.points = "red",
  offset = 0.025)

# Print and plot results for network meta-analysis
nma
forest(nma)

# Conduct component network meta-analysis (CNMA)
cnma <- netcomb(nma)
cnma

# Compare results of NMA and additive CNMA
nb <- netbind(nma, cnma, name = c("Standard NMA", "Additive CNMA"))
forest(nb)

# Use previous settings
settings.meta(oldset)
}
```

Bassler2004 *Studies on Ketotifen Alone or as Additional Medication for Long-Term Control of Asthma and Wheeze in Children*

Description

Results from ten trials reporting the physicians' judgement on the overall efficacy of ketotifen for long-term control of asthma and wheeze in children.

Usage

```
Bassler2004
```

Format

The data frame contains the following columns:

study	`character`	study label
Ee	`integer`	number of children with treament success (ketotifen group)
Ne	`integer`	number of children (ketotifen group)
Ec	`integer`	number of children with treament success (control group)
Nc	`integer`	number of children (control group)
blind	`character`	blinding of clinicians

Details

Results from ten trials reporting the physicians' judgement on the overall efficacy of Ketotifen for long-term control of asthma and wheeze in children. A prespecified subgroup analysis was conducted to evaluate whether the treatment effect is different in trials with adequate blinding compared to trials with inadequate / unclear blinding.

This data set is used as an example in Schwarzer et al. (2015).

Concepts

risk ratios, medicine, subgroup analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Bassler D, Mitra AAD, Ducharme FM, Forster J, Schwarzer G (2004): Ketotifen alone or as additional medication for long-term control of asthma and wheeze in children. *Cochrane Database of Systematic Reviews*, **1**, CD001384. doi:10.1002/14651858.CD001384.pub2

References

Schwarzer G, Carpenter JR and Rücker G (2015): *Meta-Analysis with R (Use-R!)*. Springer International Publishing, Switzerland

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Use DerSimonian-Laird estimator (which was the default in meta in the year 2015).
# Furthermore, print meta-analysis results with two digits.
```

```
oldset <- settings.meta(method.tau = "DL", digits = 2)

# Calculate experimental and control event rates
with(Bassler2004, summary(Ee / Ne))
with(Bassler2004, summary(Ec / Nc))

# Conduct meta-analysis using the inverse variance method
mb3 <- metabin(Ee, Ne, Ec, Nc, method = "I",
  data = Bassler2004, studlab = study)
mb3

# Conduct subgroup analysis comparing trials with adequate blinding
# to trials with inadequate or unclear blinding
mb3s <- update(mb3, subgroup = blind, print.subgroup.name = FALSE)
mb3s

# Conduct subgroup analysis assuming common between-study variance in subgroups
mb3s.c <- update(mb3s, tau.common = TRUE)
mb3s.c

# Use previous settings
settings.meta(oldset)
}
```

`Curtin2002` *Studies on Potassium Supplementation to Reduce Diastolic Blood Pressure*

Description

Results from 21 cross-over studies evaluating the effect of potassium supplementation to reduce diastolic blood pressure.

Usage

```
Curtin2002
```

Format

The data frame contains the following columns:

author	`character`	first author
year	`character`	year of publication
N	`integer`	total sample size
mean	`numeric`	mean difference in diastolic blood pressure
SE	`numeric`	standard error
corr	`numeric`	within-patient correlation

Details

Results from 21 cross-over studies evaluating the effect of potassium supplementation to reduce diastolic blood pressure (Curtin et al., 2002, Table II).

This data set is used as an example in Schwarzer et al. (2015), Chapter 2.

Concepts

mean differences

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Curtin F, Altman DG, Elbourne D (2002): Meta-analysis combining parallel and cross-over clinical trials. I: Continuous outcomes. *Statistics in Medicine*, **21**(15), 2131–2144. doi:10.1002/sim.1205

References

Schwarzer G, Carpenter JR and Rücker G (2015): *Meta-Analysis with R (Use-R!)*. Springer International Publishing, Switzerland

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Use DerSimonian-Laird estimator (which was the default in meta in the year 2015).
# Furthermore, print meta-analysis results with two digits.
oldset <- settings.meta(method.tau = "DL", digits = 2)

# Conduct meta-analysis
mg2 <- metagen(mean, SE, studlab = paste(author, year),
  data = Curtin2002, sm = "MD")
mg2

# Use previous settings
settings.meta(oldset)
}
```

`Dogliotti2014` *Studies on Antithrombotic Treatments to Prevent Strokes*

Description

Results from 20 trials examining the effectiveness of antithrombotic treatments to prevent strokes in patients with non-valvular atrial fibrillation.

Usage

```
Dogliotti2014
```

Format

The data frame contains the following columns:

study	`character`	study label
id	`numeric`	study ID
treatment	`character`	treatment
stroke	`numeric`	number of strokes
total	`numeric`	number of individuals

Details

This data set comes from a systematic review aiming to estimate the effects of eight antithrombotic treatments including placebo in reducing the incidence of major thrombotic events in patients with non-valvular atrial fibrillation (Dogliotti et al., 2014).

The review included 20 studies with 79,808 participants, four studies are three-arm studies. The primary outcome is stroke reduction (yes / no).

Concepts

medicine, odds ratios, network meta-analysis, Mantel-Haenszel method

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Dogliotti A, Paolasso E, Giugliano RP (2014): Current and new oral antithrombotics in non-valvular atrial fibrillation: A network meta-analysis of 79808 patients. *Heart*, **100**(5), 396–405. doi:10.1136/heartjnl2013304347

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print odds ratios and confidence limits with two digits
oldset <- settings.meta(digits = 2)

# Change appearance of confidence intervals
cilayout("(", "-")

# Transform data from long arm-based format to contrast-based
# format. Argument 'sm' has to be used for odds ratio as summary
# measure; by default the risk ratio is used in the metabin function
# called internally.
pw <- pairwise(treat = treatment, n = total, event = stroke,
  studlab = study, data = Dogliotti2014, sm = "OR")

# Print log odds ratios (TE) and standard errors (seTE)
head(pw, 5)[, 1:5]

# Conduct network meta-analysis (NMA) with placebo as reference
nma <- netmeta(pw, ref = "plac")

# Details on excluded study
selvars <- c("studlab", "event1", "n1", "event2", "n2")
subset(pw, studlab == "WASPO, 2007")[, selvars]

# Show network graph
netgraph(nma, seq = "optimal", number = TRUE)

# Conduct Mantel-Haenszel NMA
nma_mh <- netmetabin(pw, ref = "plac")

# Compare results of inverse variance and Mantel-Haenszel NMA
nb <- netbind(nma, nma_mh, random = FALSE,
  name = c("Inverse variance", "Mantel-Haenszel"))
forest(nb, xlim = c(0.15, 2), at = c(0.2, 0.5, 1, 2))

# Print and plot results for inverse variance NMA
nma
forest(nma)

# Use previous settings
settings.meta(oldset)
}
```

Description

Results from 41 trials examining the safety of inhaled medications in patients with chronic obstructive pulmonary disease.

Usage

```
Dong2013
```

Format

The data frame contains the following columns:

id	`integer`	study ID
treatment	`character`	treatment
death	`integer`	mortality
randomized	`integer`	number of individuals

Details

This network meta-analysis compared the safety of inhaled medications in patients with chronic obstructive pulmonary disease (Dong et al., 2013).

Mortality was reported in 41 randomized trials, with a total of 52 462 patients. Mortality was low, with 2 408 deaths (4.6%) reported across all studies. There were nine studies that reported zero events in at least one of the treatment arms and three additional studies had zero events in all treatment arms.

This data set was used in Efthimiou et al. (2019) to illustrate the Mantel-Haenszel method for network meta-analysis.

Concepts

medicine, odds ratios, network meta-analysis, Mantel-Haenszel method

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Dong, Y.-H., Lin, H.-H., Shau, W.-Y., Wu, Y.-C., Chang, C.-H., & Lai, M.-S. (2013). Comparative safety of inhaled medications in patients with chronic obstructive pulmonary disease: Systematic review and mixed treatment comparison meta-analysis of randomised controlled trials. *Thorax*, **68**(1), 48–56. doi:10.1136/thoraxjnl2012201926

References

Efthimiou, O., Rücker, G., Schwarzer, G., Higgins, J., Egger, M., & Salanti, G. (2019). A Mantel-Haenszel model for network meta-analysis of rare events. *Statistics in Medicine*, **38**(16), 2992–3012. doi:10.1002/sim.8158

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print odds ratios and confidence limits with two digits
oldset <- settings.meta(digits = 2)

# Change appearance of confidence intervals
cilayout("(", "-")

# Transform data from long arm-based format to contrast-based
# format. Argument 'sm' has to be used for odds ratio as summary
# measure; by default the risk ratio is used in the metabin function
# called internally.
pw <- pairwise(treatment, death, randomized, studlab = id,
  data = Dong2013, sm = "OR")

# Calculated log odds ratios (TE) and standard errors (seTE)
pw[1:3, 1:9]

# Conduct Mantel-Haenszel network meta-analysis (NMA)
nma <- netmetabin(pw, ref = "plac")

# Network graph
netgraph(nma, seq = "optimal", col = "black", plastic = FALSE,
  points = TRUE, pch = 21, cex.points = 3, col.points = "black",
  bg.points = "gray", thickness = "se.fixed",
  number.of.studies = TRUE)

# Show results for Mantel-Haenszel NMA
nma
forest(nma)

# League table with network estimates in lower triangle and direct
# estimates in upper triangle
netleague(nma)

# Assess inconsistency
print(netsplit(nma), show = "both", ci = TRUE, overall = FALSE,
  nchar.trts = 6)

# Use previous settings
settings.meta(oldset)
}
```

Description

Results from 19 studies assessing the prevalence of depression after myocardial infarction

Usage

```
Feng2019
```

Format

The data frame contains the following columns:

author	character	first author
year	integer	publication year
region	character	country
design	character	study design
source	character	sample source
age	numeric	mean age
males	numeric	percentage of males
first	numeric	percentage of first-time MI
questionnaire	character	self-report questionnaire
interview	character	structured interview
timing	character	timing of depression assessment
depr	integer	subjects with depression
n	integer	sample size

Details

This data set comes from a meta-analysis with 19 studies to estimate the prevalence of depression after a myocardial infarction. The variables depr and n contain the number of depressive patients and the total number of patients.

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Feng L, Li L, Liu W, et al. (2019): Prevalence of depression in myocardial infarction: A PRISMA-compliant meta-analysis. *Medicine*, **98**.

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Conduct random effects meta-analysis
mp1 <- metaprop(depr, n, data = Feng2019,
  studlab = paste(author, year),
```

```
  common = FALSE, prediction = TRUE)

# Create forest plot
forest(mp1, digits = 3, xlim = c(0, 1),
  print.pval.Q = FALSE, details = TRUE)
}
```

`Franchini2012` *Studies on Dopamine Agonists to Reduce "Off-Time" in Patients with Advanced Parkinson Disease*

Description

Results from 7 trials examining the effectiveness of four dopamine agonists and placebo to reduce "off-time" in patients with advanced Parkinson disease.

Usage

```
Franchini2012
```

Format

The data frame contains the following columns:

Study	`character`	study label
Treatment1	`character`	treatment 1
y1	`numeric`	treatment effect arm 1
sd1	`numeric`	standard deviation arm 2
n1	`integer`	sample size arm 1
Treatment2	`character`	treatment 2
y2	`numeric`	treatment effect arm 2
sd2	`numeric`	standard deviation arm 2
n2	`integer`	sample size arm 1
Treatment3	`character`	treatment 3
y3	`numeric`	treatment effect arm 3
sd3	`numeric`	standard deviation arm 2
n3	`integer`	sample size arm 1

Details

This network meta-analysis compared the effectiveness of four active treatments and placebo in patients with advanced Parkinson disease (Franchini et al., 2012). The outcome is mean lost work-time reduction in patients given dopamine agonists as adjunct therapy. The data are given as sample size, mean, and standard deviation in each trial arm.

This data set was used as an example in the supplemental material of Dias et al. (2013) where placebo is coded as 1 and the four active drugs as 2 to 5.

Concepts

medicine, mean differences, network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Dias S, Sutton AJ, Ades AE, Welton NJ (2013): Evidence synthesis for decision making 2: A generalized linear modeling framework for pairwise and network meta-analysis of randomized controlled trials. *Medical Decision Making*, **33**(5), 607–617. doi:10.1177/0272989X12458724

Franchini AJ, Dias S, Ades AE, Jansen JP, Welton, NJ (2012): Accounting for correlation in network meta-analysis with multi-arm trials. *Research Synthesis Methods*, **3**(2), 142–160. doi:10.1002/jrsm.1049

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print mean differences with two digits
oldset <- settings.meta(digits = 2)

# Transform data from wide arm-based format to contrast-based
# format. Argument 'sm' must not be provided as the mean difference
# is the default in R function metacont() called internally.
pw <- pairwise(list(Treatment1, Treatment2, Treatment3),
  n = list(n1, n2, n3),
  mean = list(y1, y2, y3),
  sd = list(sd1, sd2, sd3),
  data = Franchini2012, studlab = Study, sm = "MD")

# Show calculated mean differences (TE) for first three studies
pw[1:5, c(3:7, 10, 1)]

# Conduct network meta-analysis
nma <- netmeta(pw)
nma

# Draw network graph
netgraph(nma, points = TRUE, cex.points = 3, cex = 1.5,
  plastic = TRUE, thickness = "se.fixed",
  iterate = TRUE, start = "eigen")

# Use previous settings
settings.meta(oldset)
}
```

Furukawa2003 *Studies on Low Dosage Tricyclic Antidepressants for the Treatment of Depression*

Description

Results on depression severity from 17 studies comparing low dosage tricyclic antidepressants (TCA) and placebo for the treatment of depression.

Usage

```
Furukawa2003
```

Format

The data frame contains the following columns:

author	character	First author with information on dosage in parentheses
Ne	integer	number of patients in low TCA group
Me	numeric	depression severity (low TCA)
Se	numeric	standard deviation (low TCA)
Nc	integer	number of patients in placebo group
Mc	numeric	depression severity (placebo)
Sc	numeric	standard deviation (placebo)
measure	character	depression scale

Details

Furukawa et al. (2003) carried out a systematic review comparing low dosage tricyclic antidepressants (TCA) with placebo for the treatment of depression. They reported the effect on presence/absence of depression and on depression severity at various time points. Here we focus on depression severity at four weeks. Most studies used some version of the Hamilton Depression Rating Scale, however, some studies used the Montgomery-Asberg Depression Rating Scale. Accordingly, it is not possible to pool the estimated effects directly.

This data set is used as an example in Schwarzer et al. (2015).

Concepts

standardized mean differences

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Furukawa TA, McGuire H, Barbui C (2003): Low dosage tricyclic antidepressants for depression. *Cochrane Database of Systematic Reviews*, **3**, CD003197. doi:10.1002/14651858.CD003197

References

Schwarzer G, Carpenter JR and Rücker G (2015): *Meta-Analysis with R (Use-R!)*. Springer International Publishing, Switzerland

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Use RevMan5 settings
oldset <- settings.meta("RevMan5", digits = 2)

# Conduct random effects meta-analysis with Hedges' g as effect measure
mc2 <- metacont(Ne, Me, Se, Nc, Mc, Sc, common = FALSE,
  data = Furukawa2003, sm = "SMD")
mc2

# Use previous settings
settings.meta(oldset)
}
```

Greb2008 *Trials on High-Dose Chemotherapy with Autologous Stem Cell Transplantation in Aggressive Non-Hodgkin Lymphoma*

Description

Results on complete response from 14 trials evaluating high-dose chemotherapy with autologous stem cell transplantation in patients with aggressive non-Hodgkin lymphoma.

Usage

```
Greb2008
```

Format

The data frame contains the following columns:

study	`character`	study label
Ee	`integer`	complete responses (high-dose chemotherapy)
Ne	`integer`	number of patients (high-dose chemotherapy)

Ec	`integer`	complete responses (standard chemotherapy)
Nc	`integer`	number of patients (standard chemotherapy)

Details

Greb et al. (2008) conducted a Cochrane Review to assess the effects of high-dose chemotherapy with autologous stem cell transplantation as part of the first-line treatment of adult patients with aggressive non-Hodgkin lymphoma. The primary outcome was survival time; the binary outcome 'complete response' was one of several secondary outcomes. For binary outcomes, the Cochrane review used the risk ratio and the common effect model.

This data set is used as an example in Schwarzer et al. (2015).

Concepts

medicine, oncology, risk ratios

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Greb A, Bohlius J, Schiefer D, et al. (2008): High-dose chemotherapy with autologous stem cell transplantation in the first line treatment of aggressive non-Hodgkin lymphoma (NHL) in adults. *Cochrane Database of Systematic Reviews*, **1**, doi:10.1002/14651858.CD004024.pub2

References

Schwarzer G, Carpenter JR and Rücker G (2015): *Meta-Analysis with R (Use-R!)*. Springer International Publishing, Switzerland

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Use RevMan 5 settings
oldset <- settings.meta("RevMan5")

# Conduct common effect meta-analysis with risk ratio as effect measure
mb1 <- metabin(Ee, Ne, Ec, Nc,
  data = Greb2008, studlab = study,
  label.e = "High dose", label.c = "Standard",
  label.left = "Favours standard chemotherapy",
  label.right = "Favours high dose chemotherapy",
  col.label.left = "red", col.label.right = "green")
mb1

# Create forest plot
```

```
forest(mb1)

# Use previous settings
settings.meta(oldset)
}
```

`Greenland1992` *Case-Control Studies on Impact of Alcohol Consumption on Breast Cancer Risk*

Description

Results from 16 case-control studies evaluating the impact of alcohol consumption on breast cancer risk.

Usage

```
Greenland1992
```

Format

The data frame contains the following columns:

author	`character`	first author
year	`integer`	publication year
b	`numeric`	adjusted log risk ratio
SE	`numeric`	standard error

Details

Greenland and Longecker (1992) describe a method to combine trend estimates from summarised dose-response data. A meta-analysis of 16 case-control studies evaluating the impact of alcohol consumption on breast cancer risk was used as an illustrative example. The estimates are the increase in the log relative risk of breast cancer associated with an average daily alcohol consumption of 1g.

The data are provided in Greenland and Longecker (1992), Table 3.

Concepts

epidemiology, risk ratios

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Greenland S, Longnecker MP (1992): Methods for trend estimation from summarized dose-response data, with applications to meta-analysis. *American Journal of Epidemiology*, **135**(11): 1301–9.

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Inverse variance method
mg <- metagen(b, SE, data = Greenland1992,
  studlab = paste(author, year), sm = "RR",
  random = FALSE, overall.hetstat = FALSE,
  backtransf = FALSE)
# Overall result
print(mg, digits = 5)
# Standard error for common effect estimate
round(mg$seTE.common, 5)
}
```

Gurusamy2011 *Studies on Interventions to Reduce Mortality after Liver Transplantation*

Description

Results from 14 trials examining the mortality risk of interventions for decreasing blood loss and blood transfusion requirements during liver transplantation.

Usage

```
Gurusamy2011
```

Format

The data frame contains the following columns:

study	`character`	study information
treatment	`character`	treatment
death	`integer`	mortality at 60 days post-transplantation
n	`integer`	number of individuals

Details

This network meta-analysis compared the effectiveness of seven interventions for decreasing blood loss and blood transfusion requirements during liver transplantation (Gurusamy et al., 2011).

Fourteen studies reported mortality at 60 days, in 1,002 patients. Forty-five deaths were reported across all studies (4.5%). Six studies observed deaths in all treatment arms while three studies did not observe any deaths.

This data set was used in Efthimiou et al. (2019) to introduce the Mantel-Haenszel method for network meta-analysis.

One of the treatments (solvent detergent plasma) was only included in one study with zero events in both treatment arms; this study was excluded from all network meta-analyses. In addition, no death was observed in the antithrombin III arm of the only study evaluating this treatment which was excluded from the Mantel-Haenszel network meta-analysis.

Concepts

medicine, odds ratios, network meta-analysis, Mantel-Haenszel methods

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Gurusamy KS, Pissanou T, Pikhart H, Vaughan J, Burroughs AK, Davidson BR (2011): Methods to decrease blood loss and transfusion requirements for liver transplantation. *Cochrane Database of Systematic Reviews*, **12**, CD009052. doi:10.1002/14651858.CD009052.pub2

References

Efthimiou O, Rücker G, Schwarzer G, Higgins J, Egger M, Salanti G (2019): A Mantel-Haenszel model for network meta-analysis of rare events. *Statistics in Medicine*, **38**(16), 2992–3012. doi:10.1002/sim.8158

Examples

```
# Only study evaluating solvent detergent plasma
subset(Gurusamy2011, study == "Williamson 1999")

# Only study evaluating antithrombin III
subset(Gurusamy2011, study == "Baudo 1992")


if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print odds ratios and confidence limits with two digits
oldset <- settings.meta(digits = 2)
```

```
# Change appearance of confidence intervals
cilayout("(", "-")

# Transform data from long arm-based format to contrast-based
# format. Argument 'sm' has to be used for odds ratio as summary
# measure; by default the risk ratio is used in the metabin function
# called internally.
pw <- pairwise(treatment, death, n, studlab = study,
  data = Gurusamy2011, sm = "OR")

# Conduct Mantel-Haenszel network meta-analysis (NMA)
nma_MH <- netmetabin(pw, ref = "cont")

# Conduct inverse variance (IV) network meta-analysis
nma_IV <- netmeta(pw, ref = "cont")

# Network graph (Mantel-Haenszel NMA)
netgraph(nma_MH, seq = "optimal", col = "black", plastic = FALSE,
  points = TRUE, pch = 21, cex.points = 3, col.points = "black",
  bg.points = "gray", thickness = "se.fixed",
  number.of.studies = TRUE)

# Full network graph (based on inverse variance method, including
# study comparing Antithrombin III with Control/Placebo)
netgraph(nma_IV,
  seq = "optimal", col = "black", plastic = FALSE,
  points = TRUE, pch = 21, cex.points = 3, col.points = "black",
  bg.points = "gray", thickness = "se.fixed",
  number.of.studies = TRUE)

# Compare results for Mantel-Haenszel and IV NMA
forest(netbind(nma_MH, nma_IV,
  random = FALSE, name = c("MH NMA", "IV NMA")))

# Show results for Mantel-Haenszel NMA
nma_MH
forest(nma_MH)

# League table with network estimates in lower triangle and direct
# estimates in upper triangle
netleague(nma_MH)

# Assess inconsistency
print(netsplit(nma_MH), show = "both", ci = TRUE, overall = FALSE,
  nchar.trts = 6)

# Use previous settings
settings.meta(oldset)
}
```

Hamza2021 *Antidepressants Dataset for Dose-Response Network Meta-Analysis*

Description

Results from 170 trials examining 20 antidepressants and placebo in adults with major depressive disorder.

Usage

```
Hamza2021
```

Format

The data frame contains the following columns:

id	numeric	study ID
drug	character	treatment
dose	numeric	drug dose
resp	numeric	number of responders in treatment arm
total	numeric	sample size in treatment arm
rob	character	risk of bias (low / high)
age	numeric	mean age in treatment arm
year	numeric	year of publication
year.c	numeric	year centered around 2010
class	character	drug class
dose_label	ordered	drug dose as licensed or lower / higher
dose_flux	numeric	fluoxetine-equivalent dose
varlnOR	character	variance of log odds ratio (comparison to reference)

Details

This dataset goes back to the network meta-analysis by Cipriani et al. (2018) evaluting 20 antidepressants and placebo in adults with major depressive disorder. The primary outcome is the response rate, defined as the proportion of patients achieving at least a 50% reduction in symptoms.

The dataset and code to conduct a Bayesian dose-response network meta-analyis is publicly available on Zenodo (Hamza et al., 2021). The data have been used in two methodological publications on statistical methods for dose-response network meta-analysis (Hamza et al., 2024; Petropoulou et al., 2025). A reduced version of this data set is available in R package **netdose** under the name 'antidepressants'.

The data set is in long arm-based format, i.e., one treatment arm per row.

Concepts

medicine, depression, odds ratios, component network meta-analysis

Source

Hamza T, Furukawa TA, Orsini N, Cipriani A, Iglesias C, Salanti G (2021): A dose-effect network meta-analysis model: an application in antidepressants. *Zenodo*. doi:10.5281/zenodo.5866456

References

Cipriani A et al. (2018): Comparative efficacy and acceptability of 21 antidepressant drugs for the acute treatment of adults with major depressive disorder: a systematic review and network meta-analysis. *Lancet*, **391**, 1357–66

Hamza T, Furukawa TA, Orsini N, Cipriani A, Iglesias CP, Salanti G (2024): A dose–effect network meta-analysis model with application in antidepressants using restricted cubic splines. *Statistical Methods in Medical Research*, **33**, 1461–72

Petropoulou M, Rücker G, Schwarzer G (2026): Network meta-analysis with dose-response relationships. *BMC Medical Research Methodology*, **26**, 17

Examples

```
if (requireNamespace("netdose", quietly = TRUE)) {
# Load netdose package
library("netdose")

pw <- pairwise(agent = drug, dose = dose, studlab = id,
  event = resp, n = total, data = Hamza2021, sm = "OR")

## Not run:
# Do not execute without user input due to the long run time
drnma.quad <- netdose(TE, seTE, agent1, dose1, agent2, dose2, studlab,
  data = pw, method = "quadratic")
dotplot(drnma.quad)
plot(drnma.quad)

## End(Not run)
}
```

`Higgins2008` *Trials on Haloperidol in Schizophrenia*

Description

Results on clinical improvement after therapy from 17 trials evaluating haloperidol in patients with schizophrenia.

Usage

```
Higgins2008
```

Format

The data frame contains the following columns:

author	character	study label
resp.halo	integer	number of responders (haloperidol group)
fail.halo	integer	number of failures (haloperidol group)
miss.halo	integer	number of missing observations (haloperidol group)
resp.plac	integer	number of responders (placebo group)
fail.plac	integer	number of failures (placebo group)
miss.plac	integer	number of missing observations (placebo group)

Details

Higgins et al. (2008) suggested several imputation methods for the meta-analysis of binary outcomes with missing data. The example data set with 17 trials comes originally from a Cochrane review comparing haloperidol with placebo for the treatment of schizophrenia. While the antipsychotic benefits of haloperidol were identified in the 1950's, trials in this patient population are prone to high proportions of missing outcome data, often due to insufficient compliance with randomised controlled trial protocols.

The outcome is clinical improvement after therapy. For each study, the number of responders, failures, and missing observations are available.

Concepts

psychiatry, odds ratios, missing data

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Higgins JPT, White IR, Wood AM (2008): Imputation methods for missing outcome data in meta-analysis of clinical trials. *Clinical Trials*, **5**: 225-39

Examples

```
if (requireNamespace("metasens", quietly = TRUE)) {
# Load metasens package
library("metasens")

# Print odds ratios and confidence limits with three digits
oldset <- settings.meta(digits = 3)

# Conduct common effect meta-analysis of available data
ma <- metabin(resp.halo, resp.halo + fail.halo,
  resp.plac, resp.plac + fail.plac,
  data = Higgins2008, studlab = author,
  sm = "OR", method = "Inverse", random = FALSE,
```

```
  label.e = "Haloperidol", label.c = "Placebo",
  label.left = "Favours placebo",
  label.right = "Favours haloperidol")

# Best case scenario for haloperidol
ma_b <- metamiss(ma, miss.halo, miss.plac,
  method.miss = "b", small.values = "undesirable")
# Worst case scenario for haloperidol
ma_w <- metamiss(ma, miss.halo, miss.plac,
  method.miss = "w", small.values = "undesirable")

# Forest plot
ma_sens <- metamerge(ma, ma_b, text.pooled2 = "Best case scenario")
ma_sens <- metamerge(ma_sens, ma_w, text.pooled2 = "Worst case scenario")
forest(ma_sens)
}
```

`Hong2015` *Studies on Interventions for Patients with Knee Pain Secondary to Osteoarthritis*

Description

Results from 54 trials comparing physical therapy interventions for community-dwelling adults with knee pain secondary to osteoarthritis.

Usage

```
Hong2015
```

Format

The data frame contains the following columns:

id	`numeric`	study ID
trt	`character`	intervention
n	`numeric`	number of individuals
mean_pain	`numeric`	mean (pain outcome)
sd_pain	`numeric`	standard deviation (pain outcome)
mean_disability	`numeric`	mean (disability outcome)
sd_disability	`numeric`	standard deviation (disability outcome)

Details

This data set comprises 54 trials from a network meta-analysis comparing 11 physical therapy interventions, including 'placebo' and 'no treatment' for community-dwelling adults with knee pain secondary to osteoarthritis (Hong et al., 2015).

Two patient-reported continuous outcomes were considered. Pain was reported in 51 studies, whereas disability was only reported in 26 trials. Evidence was available for all 11 interventions for both outcomes of interest.

Concepts

medicine, pain, mean differences, network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Hong H, Chu H, Zhang J, Carlin BP (2016): A Bayesian missing data framework for generalized multiple outcome mixed treatment comparisons. *Research Synthesis Methods*, **7**, 6–22. doi:10.1002/jrsm.1153

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Transform data from long arm-based format to contrast-based format
pw_pain <- pairwise(trt, n = n, mean = mean_pain, sd = sd_pain,
  studlab = id, data = Hong2015)
#
pw_dis <- pairwise(trt, n = n, mean = mean_disability, sd = sd_disability,
  studlab = id, data = Hong2015)

# Conduct random effects network meta-analysis (NMA) with
# - 'no treatment' as reference
# - results from split-mouth designs as correlated outcomes
nma_pain <- netmeta(pw_pain, common = FALSE, reference.group = "No treatment",
  small.values = "desirable")
nma_dis <- netmeta(pw_dis, common = FALSE, reference.group = "No treatment",
  small.values = "desirable")

# P-scores
netrank(nma_pain)
netrank(nma_dis)
}
```

`Jalota2011` *Studies on Interventions for Pain Prevention of Propofol Injection*

Description

Results from 102 trials comparing seven drug and non-drug interventions to prevent pain during propofol injection.

Usage

```
Jalota2011
```

Format

The data frame contains the following columns:

id	`numeric`	study ID
study	`character`	study label
trt	`character`	treatment
pain	`numeric`	number of individuals with pain
n	`numeric`	number of individuals
author	`character`	first author
year	`numeric`	year of publication

Details

This data set comes from a systematic review of randomized controlled trials on seven drug and non-drug interventions to prevent pain during propofol injection (Jalota et al., 2011). The binary outcome was pain, with relative risk (RR) as a measure of effect.

The core data were extracted from R package **nmadb** using the command `readByID("482001")`.

Concepts

medicine, pain, risk ratios, network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Jalota L, Kalira V, George E, et al. (2011): Prevention of pain on injection of propofol: systematic review and meta-analysis. *British Medical Journal*, **342**, d1110. doi:10.1136/bmj.d1110.

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print risk ratios and confidence limits with two digits
oldset <- settings.meta(digits = 2)

# Transform data from long arm-based format to contrast-based
# format. Argument 'sm' is optional as the risk ratio is used by default in
# the metabin function called internally.
pw <- pairwise(trt, pain, n, studlab = study,
  data = Jalota2011, sm = "RR")

# Conduct random effects network meta-analysis (NMA)
# with hand vein as reference
nma <- netmeta(pw, common = FALSE, ref = "Hand vein")

# Show network graph
netgraph(nma, seq = "o", multiarm = TRUE, rotate = 3 / n * 360)

# Print and plot results for network meta-analysis
nma
forest(nma,
  label.left = "Favours other", label.right = "Favours Hand vein")

# Use previous settings
settings.meta(oldset)
}
```

Linde2015 *Studies on Classes of Antidepressants for the Primary Care Setting*

Description

Results from 66 trials examining eight classes of antidepressants and placebo for the primary care setting.

Usage

```
Linde2015
```

Format

The data frame contains the following columns:

id	integer	study ID
author	character	first author

year	integer	year of publication
treatment1	character	treatment 1
treatment2	character	treatment 2
treatment3	character	treatment 3
n1	integer	number of patients (arm 1)
resp1	integer	number of early responder (arm 1)
remi1	integer	number of early remissions (arm 1)
loss1	integer	number of patients loss to follow-up (arm 1)
loss.ae1	integer	number of patients loss to follow-up due to adverse events (arm 1)
ae1	integer	number of patients with adverse events (arm 1)
n2	integer	number of patients (arm 2)
resp2	integer	number of early responder (arm 2)
remi2	integer	number of early remissions (arm 2)
loss2	integer	number of patients loss to follow-up (arm 2)
loss.ae2	integer	number of patients loss to follow-up due to adverse events (arm 2)
ae2	integer	number of patients with adverse events (arm 2)
n3	integer	number of patients (arm 3)
resp3	integer	number of early responder (arm 3)
remi3	integer	number of early remissions (arm 3)
loss3	integer	number of patients loss to follow-up (arm 3)
loss.ae3	integer	number of patients loss to follow-up due to adverse events (arm 3)
ae3	integer	number of patients with adverse events (arm 3)

Details

This data set comes from a systematic review of 8 pharmacological treatments of depression and placebo in primary care with 66 studies (8 of which were 3-arm studies) including 14,785 patients.

The primary outcome is early response, defined as at least a 50% score reduction on a depression scale after completion of treatment. Secondary outcomes (also measured as dichotomous) were early remission (defined as having a symptom score below a fixed threshold after completion of treatment), lost to follow-up, lost to follow-up due to adverse events, and any adverse event. The odds ratio was used as effect measure.

This data set was used as an example in Rücker and Schwarzer (2017) who introduced methods to resolve conflicting rankings of outcomes in network meta-analysis.

Concepts

medicine, psychiatry, odds ratios, network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Linde, K., Kriston, L., Rücker, G., Jamil, S., Schumann, I., Meissner, K., Sigterman, K., & Schneider, A. (2015). Efficacy and acceptability of pharmacological treatments for depressive disorders in primary care: Systematic review and network meta-analysis. *Annals of Family Medicine*, **13**(1), 69–79. doi:10.1370/afm.1687

References

Rücker, G., & Schwarzer, G. (2017). Resolve conflicting rankings of outcomes in network meta-analysis: Partial ordering of treatments. *Research Synthesis Methods*, **8**(4), 526–536. doi:10.1002/jrsm.1270

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print odds ratios and confidence limits with two digits
oldset <- settings.meta(digits = 2)

# Change appearance of confidence intervals
cilayout("(", "-")

# Define order of treatments in printouts
trts <- c("TCA", "SSRI", "SNRI", "NRI", "Low-dose SARI",
 "NaSSa", "rMAO-A", "Hypericum", "Placebo")

# Transform data from wide arm-based format to contrast-based format
# (outcome: early response). Argument 'sm' has to be used for odds
# ratio as summary measure; by default the risk ratio is used in the
# metabin function called internally.
pw1 <- pairwise(list(treatment1, treatment2, treatment3),
  event = list(resp1, resp2, resp3),
  n = list(n1, n2, n3),
  studlab = id, data = Linde2015, sm = "OR")

# Conduct random effects network meta-analysis for primary outcome
# (early response); small number of early responses is bad (argument
# small.values)
nma1 <- netmeta(pw1, common = FALSE, reference = "Placebo", seq = trts,
  small.values = "undesirable")
nma1

# Random effects NMA for early remission
pw2 <- pairwise(treat = list(treatment1, treatment2, treatment3),
  event = list(remi1, remi2, remi3),
  n = list(n1, n2, n3),
  studlab = id, data = Linde2015, sm = "OR")
nma2 <- netmeta(pw2, common = FALSE,
   seq = trts, ref = "Placebo", small.values = "undesirable")
nma2

# Ranking of treatments
nr1 <- netrank(nma1)
nr2 <- netrank(nma2)
nr1
nr2
```

```
# Partial order of treatment rankings (two outcomes)
outcomes <- c("Early response", "Early remission")
po12 <- netposet(nr1, nr2, outcomes = outcomes)
plot(po12)

# Use previous settings
settings.meta(oldset)
}
```

`Linde2016` *Studies on Antidepressants for the Primary Care Setting*

Description

Results from 93 trials examining 22 interventions (including placebo and usual care) for the primary care of depression.

Usage

```
Linde2016
```

Format

The data frame contains the following columns:

id	`integer`	study ID
author	`character`	first author
year	`numeric`	year of publication
resp	`numeric`	number of responders
n	`numeric`	number of patients
int	`character`	intervention label
int.long	`character`	intervention label (full name)

Details

This data set comes from a network meta-analysis of 22 treatments of depression in primary care (Linde et al., 2016), based on 93 trials (79 two-arm trials, 13 three-arm trials, and one four-arm trial). The primary outcome was response after treatment (yes/no), defined as a reduction from baseline by at least 50% on a depression scale. This data set contains log odds ratios with standard errors for all pairwise comparisons.

The interventions comprised both medical and psychological treatments, also in combination, including placebo and usual care (UC) (Linde et al., 2016). Pharmacological interventions were tricyclic antidepressants (TCA), selective serotonin reuptake inhibitors (SSRI), serotonin-noradrenaline reuptake inhibitors (SNRI), noradrenaline reuptake inhibitors (NRI), low- dose serotonin (5-HT2) antagonists and reuptake inhibitors (low-dose SARI), noradrenergic and specific serotonergic agents

(NaSSa), reversible inhibitors of monoaminoxidase A (rMAO-A), hypericum extracts, and an individualized drug. Psychological interventions were cognitive behavioral therapy (CBT; four forms: face-to-face CBT, remote therapist-led CBT, guided self-help CBT, and no or minimal contact CBT), face-to-face problem-solving therapy (PST), face-to-face interpersonal psychotherapy, face-to-face psychodynamic therapy, and "other face-to-face therapy". Combination therapies were face-to-face CBT + SSRI, face-to-face PST + SSRI, and face-to-face interpersonal psychotherapy + SSRI.

This data set was used as an example in Rücker et al. (2020) to illustrate component network meta-analysis using frequentist methods.

Concepts

medicine, psychiatry, odds ratios, network meta-analysis, component network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Linde, K., Rücker, G., Schneider, A., & Kriston, L. (2016). Questionable assumptions hampered interpretation of a network meta-analysis of primary care depression treatments. *Journal of Clinical Epidemiology*, **71**, 86–96. doi:10.1016/j.jclinepi.2015.10.010

References

Rücker, G., Petropoulou, M., & Schwarzer, G. (2020). Network meta-analysis of multicomponent interventions. *Biometrical Journal*, **62**(3), 808–821. doi:10.1002/bimj.201800167

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print odds ratios and confidence limits with two digits
oldset <- settings.meta(digits = 2)

# Define order of treatments in printouts and forest plots
trts <- c("SSRI",
  "Face-to-face CBT", "Face-to-face interpsy", "Face-to-face PST",
  "Face-to-face CBT + SSRI", "Face-to-face interpsy + SSRI",
  "Face-to-face PST + SSRI",
  "Face-to-face psychodyn", "Other face-to-face",
  "TCA", "SNRI", "NRI", "Low-dose SARI", "NaSSa", "rMAO-A", "Ind drug",
  "Hypericum",
  "Remote CBT", "Self-help CBT", "No contact CBT",
  "UC", "Placebo")

# Use pairwise() to transform data to comparison-based format
pw <- pairwise(treat = int,
```

```
  event = resp, n = n,
  studlab = paste(author, year),
  data = Linde2016,
  reference = "plac",
  sm = "OR")

# Conduct random effects network meta-analysis
nma <- netmeta(pw, reference.group = "placebo",
  seq = trts, common = FALSE)

# Network graph
netgraph(nma, seq = "o")

# Show results
nma
forest(nma, xlim = c(0.2, 50))

# Additive component network meta-analysis with placebo as inactive
# treatment
cnma <- netcomb(nma, inactive = "placebo")
cnma
forest(cnma, xlim = c(0.2, 50))

# Use previous settings
settings.meta(oldset)
}
```

`Lloyd2010` *Studies on Anti-TNF-alpha Inhibitors in Rheumatoid Arthritis*

Description

Results from 16 studies evaluating anti-TNF-alpha inhibitors in patients with rheumatoid arthritis.

Usage

```
Lloyd2010
```

Format

The data frame contains the following columns:

author	`character`	first author
year	`integer`	publication year
mean.das	`numeric`	mean for outcome DAS-28
lower.das	`numeric`	lower limit for outcome DAS-28
upper.das	`numeric`	upper limit for outcome DAS-28
mean.haq	`numeric`	mean for outcome HAQ

lower.haq	numeric	lower limit for outcome HAQ
upper.haq	numeric	upper limit for outcome HAQ
n	integer	sample size

Details

Lloyd et al. (2010) report results of a systematic review evaluating the effectiveness of anti-TNF-alpha inhibitors in the treatment of rheumatoid arthritis. The authors conducted separate meta-analyses for HAQ and DAS-28.

Concepts

medicine, mean differences

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Lloyd, S., Bujkiewicz, S., Wailoo, A.J., et al. (2010). The effectiveness of anti-TNF-alpha therapies when used sequentially in rheumatoid arthritis patients: A systematic review and meta-analysis. *Rheumatology (Oxford)*, **49**, 2313-21. doi:10.1093/rheumatology/keq169

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Only consider studies providing data for both outcomes
lloyd5 <- subset(Lloyd2010, !is.na(mean.haq) & !is.na(mean.das))

# Univariate meta-analysis of the DAS-28 outcome
m.das <- metagen(mean.das,
  lower = lower.das, upper = upper.das,
  data = lloyd5, sm = "MD",
  studlab = paste(author, year),
  random = FALSE)
# Univariate meta-analysis of the HAQ outcome
m.haq <- metagen(mean.haq,
  lower = lower.haq, upper = upper.haq,
  data = lloyd5, sm = "MD",
  studlab = paste(author, year),
  random = FALSE)

# Forest plots
forest(m.das, test.overall = TRUE, hetstat = FALSE,
  digits.TE = 2, digits.se = 2)
forest(m.haq, test.overall = TRUE, hetstat = FALSE,
```

```
  digits.TE = 2, digits.se = 2)
}
```

`Moore1998` *Trials on Non-Steroidal Anti-Inflammatory Drugs in Acute Pain*

Description

Results from 37 trials evaluating non-steroidal anti-inflammatory drugs (NSAIDS) in patients with acute pain.

Usage

```
Moore1998
```

Format

The data frame contains the following columns:

id	`integer`	study ID
author	`character`	first author
year	`integer`	publication year
Ee	`integer`	number of treatment successes (NSAIDS group)
Ne	`integer`	number of patients (NSAIDS group)
Ec	`integer`	number of treatment successes (control group)
Nc	`integer`	number of patients (control group)
nonenglish	`integer`	non-English publication
medline	`integer`	listed in Medline
grey	`integer`	grey literature
samecont	`integer`	same control group
journal	`character`	journal

Details

Moore et al. (1998) conducted a systematic review of 37 randomised placebo-controlled trials on the effectiveness and safety of topical non-steroidal anti-inflammatory drugs (NSAIDS) in acute pain. The main outcome was treatment success, defined as a reduction in pain of at least 50%.

This data set is used as an example in Schwarzer et al. (2015).

Concepts

medicine, odds ratios, publication bias

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Moore, R. A., Tramèr, M. R., Carroll, D., et al. (1998). Quantitative systematic Review of topically applied non-steroidal anti-inflammatory drugs. *British Medical Journal*, **316**, 333-38

References

Schwarzer, G., Carpenter, J. R., & Rücker, G. (2015). *Meta-analysis with R*. Cham, Switzerland: Springer.

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Conduct meta-analysis
m <- metabin(Ee, Ne, Ec, Nc, data = Moore1998,
  sm = "OR", studlab = id,
  label.e = "NSAIDS", label.c = "Placebo")

# Funnel plot
fun <- funnel(m, type = "contour",
  random = FALSE, pch = 16)
legend(0.25, 1.25, bty = "n",
  legend = fun$text.contour, fill = fun$col.contour)
}
```

`Poole2003` *Trials on Mucolytic Agents in Chronic Bronchitis or Chronic Obstructive Pulmonary Disease*

Description

Results from 19 trials evaluating mucolytic agents in patients with chronic bronchitis or chronic obstructive pulmonary disease.

Usage

```
Poole2003
```

Format

The data frame contains the following columns:

author	`character`	first author
year	`integer`	publication year
Ne	`integer`	sample size (mucolytic agents)

Me	`numeric`	mean exacerbations per months (mucolytic agents)
Se	`numeric`	standard deviation (mucolytic agents)
Nc	`integer`	sample size (placebo)
Mc	`numeric`	mean exacerbations per months (placebo)
Sc	`numeric`	standard deviation (placebo)
duration	`character`	study duration

Details

Poole and Black (2003) conducted a Cochrane review to evaluate mucolytic agents versus placebo for patients with chronic bronchitis or chronic obstructive pulmonary disease. The outcome used here is the mean number of acute exacerbations per month. Acute exacerbation is defined as an increase in cough and in the volume or purulence of sputum. All 17 studies included in the meta-analysis report a mean number of exacerbations and we can work with mean differences, rather than standardised mean differences. Note, later versions of this Cochrane review no longer evaluate the mean number of exacerbations per month.

This data set is used as an example in Schwarzer et al. (2015).

Concepts

medicine, mean differences, subgroup analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Poole, P.J., Black, P.N. (2003). Mucolytic agents for chronic bronchitis or chronic obstructive pulmonary disease. *Cochrane Database of Systematic Reviews*, **1**, doi:10.1002/14651858.CD001287

References

Schwarzer, G., Carpenter, J. R., & Rücker, G. (2015). *Meta-analysis with R*. Cham, Switzerland: Springer.

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Use RevMan 5 settings
oldset <- settings.meta("RevMan5",
  digits.I2 = 2, digits.tau = 3, digits.sd = 2)

# Conduct random effects meta-analysis
m <- metacont(Ne, Me, Se, Nc, Mc, Sc, data = Poole2003,
  studlab = paste(author, year), common = FALSE,
```

```
  subgroup = duration,
  subgroup.name = "Duration", sep.subgroup = ": ",
  label.e = "Mucolytic agent",
  label.c = "Placebo",
  label.left = "Favours mucolytic agent",
  label.right = "Favours placebo",
  col.label.left = "green", col.label.right = "red")

# Forest plot
forest(m, xlim = c(-0.5, 0.2),
  xlab = paste0("Difference in mean number of\n",
    "acute exacerbations per month"))

# Use previous settings
settings.meta(oldset)
}
```

`Quan2000` *Studies on Pharmacotherapy for Hypertension*

Description

Results from 11 studies evaluating pharmacotherapy in patients with hypertension.

Usage

```
Quan2000
```

Format

The data frame contains the following columns:

study	`character`	study label
Ee	`integer`	fatal cerebrovascular events (pharmacotherapy)
Ne	`integer`	number of patients (pharmacotherapy)
Ec	`integer`	fatal cerebrovascular events (control)
Nc	`integer`	number of patients (control)

Details

Quan et al. (2000) conducted a Cochrane Review to evaluate whether the benefit of treating hypertension in women differed between younger and older women, as well as between white and African American women. In the systematic review, the Peto method was used for pooling. The primary outcome was the occurrence of fatal cerebrovascular events, a rare event in hypertension. This data set contains the subgroup of women older than 55 years.

This data set is used as an example in Schwarzer et al. (2015).

Concepts

medicine, Peto's method

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Quan, A.P., Kerlikowske, K. Gueyffier, F., et al., & Indana Investigators (2000). Pharmacotherapy for hypertension in women of different races. *Cochrane Database of Systematic Reviews*, **2**, doi:10.1002/14651858.CD002146

References

Schwarzer, G., Carpenter, J. R., & Rücker, G. (2015). *Meta-analysis with R*. Cham, Switzerland: Springer.

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Use RevMan 5 settings
oldset <- settings.meta("RevMan5")

# Conduct meta-analyis with Peto method
m <- metabin(Ee, Ne, Ec, Nc, sm = "OR", method = "Peto",
  data = Quan2000, studlab = study, random = FALSE)
m

# Use previous settings
settings.meta(oldset)
}
```

Senn2013 *Studies on Diabetes Treatments*

Description

Results from 26 trials evaluating treatments for diabetes.

Usage

```
Senn2013
```

Format

The data frame contains the following columns:

study	character	study ID
treatment	character	treatment
n	integer	sample size
mean	numeric	mean
sd	numeric	standard deviation
type	character	outcome type
author	character	first author
year	numeric	first author

Details

This network meta-analysis compared the effectiveness of nine active treatments and placebo in patients with diabetes (Senn et al., 2013). Patients enrolled in 26 studies included in this data set were treated to reduce blood glucose (HBA1c) levels. The effect measure was the mean difference of average plasma glucose concentration HbA1C and measured in mmol / mol. The outcome was either measured as a change score or post intervention (variable type).

Concepts

medicine, diabetes, mean differences, network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Senn S, Gavini F, Magrez D, Scheen A (2013): Issues in performing a network meta-analysis. *Statistical Methods in Medical Research*, **22**, 169–89

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print mean differences with two digits
oldset <- settings.meta(digits = 2)

# Transform data from long arm-based format to contrast-based
# format.
pw1 <- pairwise(studlab = study, treat = treatment,
  n = n, mean = mean, sd = sd, data = Senn2013,
  varnames = c("MD", "seMD"))

# Conduct network meta-analysis
```

```
nma1 <- netmeta(pw1, random = FALSE,
  reference.group = "placebo")
nma1

# Draw network graph
netgraph(nma1, seq = "optimal", multiarm = TRUE,
  cex = 1.5, lwd = 7, rotate = -1 / n * 360,
  pch.points = 21, bg.points = "lightblue",
  cex.points = n.trts, points.max = 10,
  labels = paste0(trts, "\n(n=", n.trts, ")"),
  offset = 0.045)

# Use previous settings
settings.meta(oldset)
}
```

`Senn2024` *Data of n-of-1 Meta-Analysis in Asthma*

Description

Results from 12 simulated patients in n-of-1 meta-analysis in asthma (Senn, 2024).

Usage

```
Senn2024
```

Format

The data frame contains the following columns:

patid	`integer`	patient ID
n.cycles	`numeric`	number of cycles
md	`numeric`	mean difference
var.md	`integer`	variance of mean difference

Details

Senn (2024) simulated data from 12 patients to describe a meta-analysis method of n-of-1 trials.

Concepts

medicine, asthma, mean differences, n-of-1 meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Senn S (2024): The analysis of continuous data from n-of-1 trials using paired cycles: a simple tutorial. *Trials*, **25**, 128

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

mg4 <- metagen(md, sqrt(var.md), cycles = n.cycles,
  data = Senn2024, studlab = paste("Patient", patid),
  sm = "MD", method.tau = "DL")
#
forest(mg4, digits.TE = 2, digits.se = 2,
  digits.sd = 2, digits.tau2 = 1, digits.weight = 2,
  xlim = c(-200, 550), at = c(-200, 0, 200, 400),
  details = TRUE)
}
```

`Spooner2002` *Studies on Nedocromil Sodium for Preventing Exercise-Induced Bronchoconstriction*

Description

Results from 17 trials, 11 studies in children and 6 studies in adults, reporting the maximum fall in the forced expiratory volume in 1 second (FEV_1) over the course of follow-up, expressed as a percentage.

Usage

```
Spooner2002
```

Format

The data frame contains the following columns:

author	`character`	first author
year	`character`	year of publication
Ne	`integer`	number of participants in nedocromil sodium group
Me	`numeric`	maximum fall in the FEV_1 (nedocromil sodium)
Se	`numeric`	standard deviation (nedocromil sodium)
Nc	`integer`	number of participants in placebo group
Mc	`numeric`	maximum fall in the FEV_1 (placebo)
Sc	`numeric`	standard deviation (placebo)
agegroup	`factor`	age group (children or adults)

Details

Spooner et al. (2002) conducted a Cochrane review comparing nedocromil sodium (experimental treatment) with placebo (control) for preventing exercise-induced bronchoconstriction. Primary outcome was the maximum fall in the forced expiratory volume in 1 second (FEV_1) over the course of follow-up, expressed as a percentage. This outcome is available for 17 studies, 11 studies in children and 6 studies in adults. For each study, the mean value, standard deviation, and sample size are reported for both the experimental and control group. The authors conducted a random-effects meta-analysis with the mean difference as effect measure, i.e.\ mean value in the nedocromil sodium group minus mean value in the placebo group.

This data set is used as an example in Schwarzer et al. (2015).

Concepts

mean differences, subgroup analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Spooner, C., Saunders, L. D., & Rowe, B. H. (2002). Nedocromil sodium for preventing exercise-induced bronchoconstriction. *Cochrane Database of Systematic Reviews*, **1**, CD001183. doi:10.1002/14651858.CD001183

References

Schwarzer, G., Carpenter, J. R., & Rücker, G. (2015). *Meta-analysis with R*. Cham, Switzerland: Springer.

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Use settings from RevMan5
oldset <- settings.meta("RevMan5")

# Conduct random effects meta-analysis with age subgroups
mc1 <- metacont(Ne, Me, Se, Nc, Mc, Sc,
                data = Spooner2002, studlab = paste(author, year),
                subgroup = agegroup, print.subgroup.name = FALSE,
                label.e = "Nedocromil sodium", label.c = "Placebo",
                common = FALSE)
mc1

# Use previous settings
```

```
settings.meta(oldset)
}
```

`Steurer2006` *Trials on Single-Agent Purine Analogues for the Treatment of Chronic Lymphocytic Leukaemia*

Description

Results from 4 trials evaluating single-agent purine analogues in patients with chronic lymphocytic leukaemia.

Usage

```
Steurer2006
```

Format

The data frame contains the following columns:

author	`character`	first author
year	`integer`	publication year
Ne	`integer`	number of patients (purine antagonists)
Nc	`integer`	number of patients (alkylator-based)
HR	`numeric`	hazard ratio
lowHR	`numeric`	lower limit
uppHR	`numeric`	upper limit
lnHR	`numeric`	log hazard ratio
selnHR	`numeric`	standard error

Details

Steurer et al. (2006) conducted a Cochrane review to evaluate the effect of single-agent purine analogues for the treatment of chronic lymphocytic leukaemia. This data set contains data from the main outcome, overall survival. Note, the hazard ratios and confidence limits have been reported in the Cochrane review with only two significant figures and were recalculated using the reported log hazard ratios and standard errors.

This data set is used as an example in Schwarzer et al. (2015).

Concepts

medicine, oncology, hazard ratios

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Steurer, M., Pall, G., Richards, S., et al. (2006). Purine antagonists for chronic lymphocytic leukaemia. *Cochrane Database of Systematic Reviews*, **3**, doi:10.1002/14651858.CD004270.pub2

References

Schwarzer, G., Carpenter, J. R., & Rücker, G. (2015). *Meta-analysis with R*. Cham, Switzerland: Springer.

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Use RevMan 5 settings
oldset <- settings.meta("RevMan5")

# Conduct common effect meta-analysis
m1 <- metagen(lnHR, selnHR, data = Steurer2006,
  studlab = paste(author, year),
  sm = "HR", random = FALSE, n.e = Ne, n.c = Nc)
m1

# Same analysis using lower and upper confidence limits
m2 <- metagen(HR, lower = lowHR, upper = uppHR,
  data = Steurer2006, transf = FALSE,
  studlab = paste(author, year),
  sm = "HR", random = FALSE, n.e = Ne, n.c = Nc)
m2

# Use previous settings
settings.meta(oldset)
}
```

Stowe2010 *Studies on Adjuvant Treatments to Levodopa Therapy for Parkinson disease*

Description

Results from 29 trials assessing efficacy of three drug classes as adjuvant treatment to levodopa therapy in patients with Parkinson disease and motor complications.

Usage

```
Stowe2010
```

Format

The data frame contains the following columns:

study	`character`	study label
id	`integer`	study id
t1	`character`	treatment 1
y1	`numeric`	treatment effect arm 1
sd1	`numeric`	standard deviation arm 1
n1	`integer`	sample size arm 1
t2	`character`	treatment 2
y2	`numeric`	treatment effect arm 2
sd2	`numeric`	standard deviation arm 2
n2	`integer`	sample size arm 2
t3	`character`	treatment 3
y3	`numeric`	treatment effect arm 3
sd3	`numeric`	standard deviation arm 3
n3	`integer`	sample size arm 3

Details

This data set contains data from a Cochrane review assessing efficacy and safety of three drug classes as adjuvant treatment to levodopa therapy in patients with Parkinson disease and motor complications (Stowe et al., 2010).

The authors conducted three pairwise meta-analyses comparing dopamine agonists, catechol-O-methyl transferase inhibitors (COMTI), and monoamine oxidase type B inhibitors (MAOBI) with placebo. The primary outcome was the mean reduction of the time spent in a relatively immobile 'off' phase (mean off-time), calculated in hours per day. Relative treatment effects were expressed as mean difference. Data on this outcome were available for 5,331 patients from 28 studies comparing an active treatment with placebo and one three-arm study comparing two active treatments with placebo.

Concepts

medicine, mean differences, network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Stowe, R., Ives, N., Clarke, C. E., Deane, K., Hilten, V., Wheatley, K., Gray, R., Handley, K., & Furmston, A. (2010). Evaluation of the efficacy and safety of adjuvant treatment to levodopa therapy in Parkinson's disease patients with motor complications. *Cochrane Database of Systematic Reviews*, **7**, CD007166. doi:10.1002/14651858.CD007166.pub2

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print mean differences with two digits and standard errors with 3
# digits
oldset <- settings.meta(digits = 2, digits.se = 3)

# Transform data from wide arm-based format to contrast-based
# format. Argument 'sm' must not be provided as the mean difference
# is the default in R function metacont() called internally.
pw <- pairwise(treat = list(t1, t2, t3), n = list(n1, n2, n3),
  mean = list(y1, y2, y3), sd = list(sd1, sd2, sd3),
  studlab = study, data = Stowe2010, sm = "MD")

# Show calculated mean differences (TE) for three studies
selstudy <- c("COMTI(E) INT-OZ", "LARGO", "COMTI(E) Nomecomt")
subset(pw, studlab %in% selstudy)[, c(3:7, 10, 1)]

# Conduct random effects network meta-analysis (NMA)
# with placebo as reference
nma <- netmeta(pw, common = FALSE, ref = "plac")

# Show network graph
netgraph(nma, number = TRUE, multiarm = TRUE,
  cex = 1.25, offset = 0.025,
  cex.number = 1, pos.number.of.studies = 0.3)

# Print NMA results
nma

# Forest plot with NMA results
forest(nma)

# Forest plot showing all network estimates of active treatments
# compared with other treatments
forest(nma, ref = c("C", "D", "M"), baseline = FALSE, drop = TRUE)

# Treatment ranking using P-scores
netrank(nma)

# Rankogram with all ranking probabilities
set.seed(1909)
ran <- rankogram(nma)
ran
plot(ran)

# Treatment ranking using SUCRAs
netrank(ran)

# League table showing network and direct estimates
```

```
netleague(nma, seq = netrank(nma), ci = FALSE)

# Use previous settings
settings.meta(oldset)
}
```

Su2018 *Studies on Interventions for Patients with Periodontal Infrabony Lesions*

Description

Results from 52 trials comparing guided tissue regeneration, enamel matrix derivatives, and their combination therapies or patients with periodontal infrabony lesions.

Usage

```
Su2018
```

Format

The data frame contains the following columns:

id	numeric	study ID
study	character	study label
trt	character	treatment
n	numeric	number of individuals
change	numeric	change in clinical attachment level
sd	numeric	standard deviation
author	character	first author
year	numeric	year of publication

Details

This data set comes from a systematic review of randomized controlled trials on eight interventions for patients with periodontal infrabony lesions (Su and Tu, 2018). The continuous outcome was change in clinical attachment between baseline and 12 months after treatment. The studies either used a parallel or split-mouth design.

Concepts

dentistry, correlated, mean differences, network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Su Y, Tu Y (2018): Statistical approaches to adjusting weights for dependent arms in network meta-analysis. *Research Synthesis Methods*, **9**, 431–40. doi:10.1002/jrsm.1304

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Transform data from long arm-based format to contrast-based format
pw <- pairwise(trt, n = n, mean = change, sd = sd,
  data = Su2018, studlab = study)


# Conduct random effects network meta-analysis (NMA) with
# - flap operation as reference
# - results from split-mouth designs as correlated outcomes
nma <- netmeta(pw, common = FALSE, reference = "Flap op",
  correlated = design == "split")

# Show network graph
netgraph(nma, seq = "o")

# Print results for network meta-analysis
nma
}
```

Thompson1999 *Trials on Serum Cholesterin Concentration Lowering and Risk of Ischaemic Heart Disease*

Description

Results from 28 trials evaluating effect of serum cholesterin concentration lowering on risk of ischaemic heart disease

Usage

```
Thompson1999
```

Format

The data frame contains the following columns:

studyid	integer	study ID
ihd.cont	integer	number of ischaemic heart disease (control group)
noihd.cont	integer	number of non-events (control group)

ihd.exp	integer	number of ischaemic heart disease (treated group)
noihd.exp	integer	number of non-events (treated group)
OR	numeric	odds ratio
logOR	numeric	log odds ratio
varlogOR	numeric	variance of log odds ratio
cholr	numeric	cholesterol reduction (mmol/l)

Details

Thompson & Sharp (1999) compare several meta-regression approaches to explain heterogeneity in meta-analysis. The data set used goes back to Law et al. (1994).

Concepts

epidemiology, odds ratios, meta-regression

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Thompson, S. G. Sharp, S. J. (1999). Explaining heterogeneity in meta-analysis: a comparison of methods. *Statistics in Medicine*, **18**: 2693-708

References

Law, M.R., Wald, N.J., Thompson, S.G. (1994). By how much and how quickly does reduction in serum cholesterol concentration lower risk of ischaemic heart disease? *British Medical Journal*, **308**, 367-73

Examples

```
if (requireNamespace("meta", quietly = TRUE)) {
# Load meta package
library("meta")

# Conduct meta-analysis
ma <- metabin(ihd.exp, ihd.exp + noihd.exp, ihd.cont, ihd.cont + noihd.cont,
  data = Thompson1999, sm = "OR", method = "Inverse")

# Thompson & Sharp (1999), Table III
# (1) None
metareg(ma, cholr, method.tau = "FE")
# (3a) Additive (MM)
metareg(ma, cholr, method.tau = "DL")
}
```

`Woods2010` *Studies on Treatments for Chronic Obstructive Pulmonary Disease*

Description

Results from three trials examining the mortality risk of three treatments and placebo in patients with chronic obstructive pulmonary disease.

Usage

```
Woods2010
```

Format

The data frame contains the following columns:

author	`character`	first author / study name
treatment	`character`	treatment
r	`integer`	number of deaths
N	`integer`	number of patients

Details

Count mortality statistics in randomised controlled trials of treatments for chronic obstructive pulmonary disease (Woods et al., 2010, Table 1).

Concepts

medicine, odds ratios, network meta-analysis

Author(s)

Guido Schwarzer, <guido.schwarzer@uniklinik-freiburg.de>

Source

Woods BS, Hawkins N, Scott DA (2010): Network meta-analysis on the log-hazard scale, combining count and hazard ratio statistics accounting for multi-arm trials: A tutorial. *BMC Medical Research Methodology*, **10**, 54. doi:10.1186/147122881054

Examples

```
if (requireNamespace("netmeta", quietly = TRUE)) {
# Load netmeta package
library("netmeta")

# Print odds ratios and confidence limits with two digits
oldset <- settings.meta(digits = 2)
```

```
# Change appearance of confidence intervals
cilayout("(", "-")

# Transform data from long arm-based format to contrast-based
# format. Argument 'sm' has to be used for odds ratio as summary
# measure; by default the risk ratio is used in the metabin function
# called internally.
pw <- pairwise(treatment, event = r, n = N,
  studlab = author, data = Woods2010, sm = "OR")
pw

# Conduct network meta-analysis
nma <- netmeta(pw)
nma

# Show forest plot
forest(nma, ref = "Placebo", drop = TRUE,
  leftlabs = "Contrast to Placebo")

# Use previous settings
settings.meta(oldset)
}
```

Index